

Patent
029419.0015.UTL1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Matthew S. Read, et al. /

Serial No.: 09/727,425 /

Filed: November 30, 2000 /

For: TAPELESS MICRO-LEADFRAME

Examiner: Luan C. Thai

Art Unit: 2827

#7/A

And

J. McMillan

7/23/02

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JUL 19 2002

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AMENDMENT AND RESPONSE

Commissioner for Patents
Washington, D.C. 20231

Sir:

The following amendments and remarks are submitted in response to the office action mailed on April 19, 2002. This response is believed to be timely in that it is submitted within 3 months of the date of mailing of the office action.

AMENDMENTS

In the claims:

Please amend the claims indicated below. The following is a clean set of all claims still pending in the application. A marked-up copy of the amended claims is attached hereto.

1. (Amended) A micro-leadframe for mounting at least one integrated

circuit, comprising:

CERTIFICATE OF TRANSMISSION
(37 C.F.R. §1.6)

I hereby certify that this paper (along with anything referred to as being attached or enclosed) is being facsimile transmitted to the United States Patent and Trademark Office, to the attention of Examiner Luan C. Thai, Art Unit 2827, at Facsimile No. (703) 872-9318 on the date shown below.

July 19, 2002
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a flat base having at least one conductive lead pattern etched on the flat base to provide electrically conductive paths for said at least one integrated circuit; and

a plurality of preload extension tabs arranged about said at least one conductive lead pattern, the preload extension tabs protruding at an angle with respect to the flat base to a predetermined height above the flat base.

2. The micro-leadframe of claim 1, wherein said at least one integrated circuit is positioned on said at least one conductive lead pattern of the flat base, said at least one integrated circuit comprising a mold cap having a predetermined height above the flat base.

3. (Amended) The micro-leadframe of claim 2, wherein said at least one integrated circuit further comprises a semiconductor die within the mold cap.

4. The micro-leadframe of claim 3, wherein the semiconductor die comprises a flipchip die.

5. The micro-leadframe of claim 3, wherein the preload extension tabs are directly connected to the mold cap.

6. (Amended) A micro-leadframe package, comprising:
a flat base having a conductive lead pattern etched on the flat base;
an integrated circuit connected to the conductive lead pattern of the flat base;

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a plurality of preload extension tabs arranged about the conductive lead pattern, the preload extension tabs protruding at an angle with respect to the flat base into the integrated circuit to a predetermined height above the flat base.

7. The micro-leadframe package of claim 6, wherein the integrated circuit comprises a plastic mold cap having a predetermined height above the flat base.

8. The micro-leadframe package of claim 7, wherein the integrated circuit further comprises a semiconductor die within the mold cap.

9. (Amended) The micro-leadframe package of claim 8, wherein the integrated circuit further comprises a plurality of lead finger connections between the semiconductor die and the conductive lead pattern.

10. The micro-leadframe package of claim 8, wherein the preload extension tabs are directly connected to the flat base.

11. A method of packaging an integrated circuit, comprising the steps of:

providing a patterned micro-leadframe having a flat base;

forming a plurality of preload extension tabs protruding from the flat base at a predetermined angle with respect to the flat base to a predetermined height above the flat base; and

attaching a mold compound to the micro-leadframe.

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12. The method of claim 11, further comprising the step of providing a top mold platten.

13. The method of claim 12, wherein the step of attaching the mold compound to the micro-leadframe comprises the step of heating the top mold platten and forcing the top mold platten against the preload extension tabs.

14. The method of claim 13, further comprising the step of providing a bottom mold platten.

Cont'd
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15. The method of claim 14, wherein the step of attaching the mold compound to the micro-leadframe further comprises the steps of heating the bottom mold platten and pressing the bottom mold platten against the patterned flat base.

16. The method of claim 11, wherein the step of forming the preload extension tabs comprises the step of bending the preload extension tabs to the predetermined angle with respect to the flat base.

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029419.0015.UTL1**REMARKS**Drawing Objections

The drawings are objected to in paragraph 2 of the Action under 37 CFR 1.83(a) for failing to show every feature of the claims. Specifically, the Action states that the flip-chip die of claim 4 and the plurality of flip-chip connections of claim 9 are not shown in the drawings.

With respect to claim 4, Applicants respectfully submit that the drawings are sufficient to support the flip-chip die limitation. Specifically, figure 4 of the present application illustrates an integrated circuit 22 in a conventional flip-chip configuration (see page 8, lines 18-20). Thus, the die 28 of circuit 22 in figure 4 is necessarily a flip-chip die, as it is referred to on page 10, line 4 of the present application, since it is part of a flip-chip integrated circuit 22.

With respect to claim 9, Applicants have amended the claim to eliminate the term "flip-chip connections" and replace it with the term "lead finger connections" so that the language of the claim and the language used in the specification are consistent.

Accordingly, Applicants respectfully submit that all limitations of the claims are adequately illustrated in the drawings and request withdrawal of this objection.

Claim Objections

Claim 3 is objected to in paragraph 3 of the Action, because the term "integrated circuit package" should simply be "integrated circuit". Applicants have amended the claim to remove the extra term "package" as suggested by the action.

Claim Rejections Under 35 USC §112

Paragraph 5 of the Action rejects claim 5 under 35 USC §112, paragraph 1, for containing subject matter that was not adequately described in the specification. Applicants

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respectfully submit, however, that the specification does disclose directly connecting the preload extension tabs with the mold cap. As illustrated from the side in figure 4, and from the top in figure 5, the extension tabs 8, 10, 46, and 48 directly connect with the mold cap 30 in order to secure the integrated circuit 22 (see page 9, lines 5-8). Thus, Applicants respectfully request withdrawal of this rejection.

Paragraph 7 of the Action rejects claims 5-10 under 35 USC §112, paragraph 2, for being indefinite. With regards to claims 6 and 9, Applicants agree that the errors were mistakenly included in the originally filed claims. Applicants have amended these claims above to correct these errors. Accordingly, Applicants submit that claims 6-10 as amended are no longer indefinite and request withdrawal of the rejection as to these claims.

With regard to claim 5, the Action again states that it is unclear as to how the preload extension tabs can be directly connected with the mold cap. As explained above, however, figures 4 and 5 clearly illustrate the preload extension tabs directly connected with the mold cap. Accordingly, Applicants believe that claim 5 is not indefinite and respectfully request withdrawal of the rejection as to this claim.

Claim Rejections Under 35 USC §102

Paragraph 9 of the action rejects claims 1-6 under 35 USC §102(e) as being anticipated by Mizuno. Applicants respectfully traverse this rejection because Mizuno does not teach, suggest or disclose all of the limitations of independent claims 1 and 6 as amended. Each of these claims have been amended to require a *flat base* with at least one *conductive lead pattern etched on the flat base*. Support for the amended claim language can be found on page 6, lines 1-6. The flat base is important because, for example, it prevents the injected mold, which forms the mold cap, from leaking out and contacting the exposed die pads. This eliminates the need to

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apply tape to the bottom of the lead frame as with conventional lead frames (see page 2, lines 10-20).

Mizuno cannot anticipate amended independent claims 1 and 6 because Mizuno does not disclose a flat base as required by amended independent claims 1 and 6. The Action states that Mizuno does disclose such a feature in figures 7A and 7B. In fact, however, these figures disclose a plurality of leads 91 each comprising a chip mounting piece 912 (see col. 1, lines 47-50). Accordingly, the lead frame illustrated in figures 7A and 7B does not comprise a flat base as required by amended independent claims 1 and 6. Further, Mizuno cannot anticipate amended independent claims 1 and 6 because it does not disclose a flat base comprising one or more conductive lead patterns etched on the flat base as required by amended independent claims 1 and 6.

Because Mizuno fails to teach, disclose or suggest every element of amended independent claims 1 and 6, Applicants respectfully request withdrawal of the rejection as to these claims. Further, because claims 2-5 depend from amended independent claim 1, which is itself allowable over Mizuno, Applicants respectfully request withdrawal of the objection as to these claims.

Paragraph 10 of the action rejects claims 1-6 under 35 USC §102(b) as being anticipated by Song. Applicants respectfully traverse this rejection because Song does not teach, suggest, or disclose all of the limitations of independent claims 1 and 6 as amended. As with Mizuno, Song does not disclose a flat base with conductive lead patterns etched thereon as required by amended independent claims 1 and 6. Accordingly, Applicants respectfully request withdrawal of the rejection as to these claims. Further, because claims 2-5 depend from amended

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independent claim 1, which is itself allowable over Song, Applicants respectfully request withdrawal of the objection as to these claims

Claim Rejections Under 35 USC §103

Paragraphs 12 and 13 of the action reject claims 7-10 under 35 USC §103(a); however, because claims 7-10 depend from amended independent claim 6, which is itself allowable over the art of record, Applicants respectfully request withdrawal of this rejection.

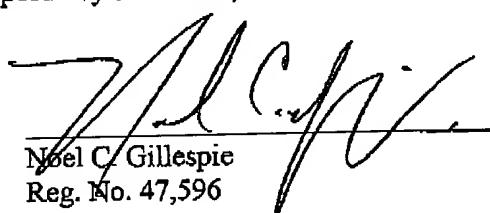
CONCLUSION

After the above Amendments, claims 1-10 are still pending in the application. Based on the above amendments and remarks, Applicants believe that the claims are in condition for allowance and such is respectfully requested. No fee is believed due with this response but the Commissioner is hereby authorized to charge any fees required by this response to our Deposit Account No. 50-1273.

Respectfully submitted,

Dated: July 19, 2002

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